tributions to science recently made by Brandt, Middendorf, Kowalewski, Radde, von Schrenck, and other distinguished names of the Academy of St. Petersburg, it becomes somewhat ridiculous to a naturalist to hear the oft-repeated assertion of the British patriot "that the Russians are as great barbarians as the Turks!"

OSCAR HERTWIG ON THE PHENOMENA OF FERTILISATION.—The last number (Vol. iii., Part 1) of the *Morphologisches Jahrbuch*, contains the second part of Oscar Hertwig's very important researches on the phenomena immediately preceding the cleavage of ova in the Echinoid *Toxopneustes*, in two genera of leeches, and in the amphibia. He has watched most carefully the process of fertilisation and the ova before fertilisation, and has examined them after the action of various reagents. His accounts are accompanied by very valuable figures. From his own observations, and a comparative study of other recorded facts, he appears to have made generalisations worthy of the attention of all biologists. The following is a brief summary of his conclusions. The unripe ovum is characterised by the possession of a germinal vesicle, distinguished from all cell-nuclei by its great relative size, by its definite membrane, its more or less fluid contents, and its possession of one or several nucleoli. The germinal vesicle in this signification does not become the nucleus of the first cleavage-sphere; in many animals it disappears long before fertilisation, in other cases during that process or during the ripening of the ovum. At any rate the germinal vesicle loses all its distinctive characters. The active nuclear substance, or a part of it, remains and forms a new nucleus of much smaller size, lacking a distinct membrane and true nucleoli. From a highly differentiated form is produced a primitive nucleus; instead of a germinal vesicle we have an ovinucleus. In Toxopneustes the retrogression of the germinal vesicle is accompanied by its movement to the outer surface of the yolk, where it disappears, with the exception of the germinal spot; the latter again reaches the centre of the yolk and becomes the nucleus of the ripe ovum. In Hirudineæ there is an accessory prelude to fertilisation, the budding-off of "directive bodies" immediately after oviposition. After this arises a spindle-shaped ovinucleus really derived from the breaking up of the germinal spot. In amphibia the exceedingly large germinal vesicle gets to the surface and disappears. Only a small portion, one or more nucleoli, passes over into the inconsiderable ovinucleus. The parts of the germinal vesicle not contributed to the ovinucleus seem no longer serviceable, and get transformed into the so-called excretory bodies and sphere. In Amphibia a mass of this kind appears as a yellowish covering over the dark pole of the egg. Like Toxopneustes appear to be Medusæ, Siphonophora, Ascidians, some Vermes, Arthropods, &c., possessing in the ripe and unfertilised ova a small homogeneous, membraneless nucleus in the middle of the yolk or on its periphery. The Hirudineæ resemble Gasteropods, Heteropods, Pteropods, and some Vermes. Here the ripe egg has mostly on its periphery a small spindle-shaped nucleus. In fishes and reptiles, as in the frog, there is a germinal vesicle with many nucleoli, some of which form the ovinucleus. After this stage Hirudineæ twice exhibit a budding from the surface of the ovum forming the so-called directive bodies, the ovinucleus contributing to them. The actual occurrences of fertilisation correspond very closely not only in animals but in plants. In Toxopneustes a single spermatozoon reaches the ripe ovum and is transformed into a small corpuscle, the sperm-nucleus, surrounded by a protoplasmic rayed figure. It travels in from ten to fifteen minutes to the central ovinucleus and is fused with it. In *Rana temporaria* the spermatozoon enters at the side of the excretory body and becomes like that of Toxopneustes, travelling to the ovinucleus and fusing with it. In Hirudineæ the spermatozoon enters subsequently to the budding of the first directive body, and after transformation gets to the centre of the ovum and there remains till the budding of the second body. Then the ovinucleus travels to the centre and is apposed to and fuses with the sperm-nucleus, which has swollen considerably. Thus in these cases the cleavage-nucleus is formed by the union of the two sexually-differentiated nuclei.

INDIVIDUAL VARIATIONS IN ANIMALS.—At the last meeting of the St. Petersburg Society of Naturalists, Prof. Wagner made a communication "On the Individual Variations in Animals, their Causes, and Results." Pointing out that the appearance of new races, varieties, and species is rendered possible by the appearance, at all stages, of the development of life of individual variations, which variations give rise afterwards to more or less constant new forms, the Professor sketched the causes of these individual variations, exterior and interior, insisting especially on the importance of these latter. The causes of variability, he said, are not only the physico-chemical influences of the medium inhabited by the individuals, *i.e.*, the exterior causes, but also, to a very important degree, the interior causes, *i.e.* those subjective physiological, and therefore also psychological, individualities which characterise each individual, and which modify to a considerable extent the influence of exterior influences on each separate representative of the species.

A NEW CHEETAH.—At the meeting of the Zoological Society on Tuesday last, Mr. Sclater described a new species of cheetah, from South Africa, differing from *Felis jubata* in the fact that the whole body is covered with spots of a dark yellow instead of black, and at the same time is considerably more thickly covered with hair. Mr. Sclater proposed the name *Felis lanea* for this apparently new species.

NORTH AMERICAN LEPIDOPTERA.—Mr. William H. Edwards has published a catalogue of the diurnal lepidoptera of North America and Northern Mexico, supplementing the well-known work by Dr. Morris, printed some years ago by the Smithsonian Institution. He enumerates no less than 506 species. This is about equal to that of the previous catalogues, the additional new species being balanced by canceling names which were synonyms or not legitimately entitled to introduction in the North American list. The special object of Mr. Edwards is to bring about what he considers a satisfactory nomenclature, dissenting from the radical changes which he insists Mr. Scudder has made in his recent divisions and lists, in few of which he concurs.

A NEW SHELL.—Mr. C. R. Thatcher, the experienced conchological collector, has just returned to this country after a five years' collecting journey through China, Japan, Philippine Islands, and Australia. He has procured several new species of Murex, Cancellaria, and one wonderful specimen of an entirely new genus. This specimen was described at the meeting of the Zoological Society on Tuesday, June 5, by Mr. George French Angas, by whom it is proposed to give the name Thatcheria, in honour of its discoverer. It was the traveller's particular aim to procure specimens of the rare *Cypræa thatcheri* and *Voluta thatcheri*, both of which he found a few years ago, for which purpose he travelled many hundreds of miles into the interior of Japan, often at the risk of his life.

GEOLOGICAL NOTES

RARE MINERALS IN THE NORTH OF SCOTLAND.—The accidental use of a mass of granite for building purposes near Tongue, in Sutherlandshire, has led to the detection of several rare minerals, and of quite a remarkable number of species and varieties associated in the same mass of rock. From among the fragments of the boulder pieces of a bright green stone were sent to the

museum of the Duke of Sutherland by Dr. Joass, of Golspie. These were afterwards analysed by Prof. Heddle, of St. Andrews, and found to be the variety of orthoclase felspar, termed amazonstone. For the purpose of more careful examination as to the mode of occurrence of this uncommon substance, Prof. Heddle has recently visited the locality, which is the side of the ridge rising to the east of the village of Tongue. He found the granite mass to be merely a large boulder, and had it thoroughly broken up. It has yielded the following remarkable assemblage of minerals:—amazonstone in simple and twin crystals, radiated cleavlandite, lepidomelane, pinite, fluorite, sphene, zircon, magnetite, ilmenite, allanite, smoky quartz with peculiar faces, and a mineral which a carefully instituted comparison shows to be thorite passing into orangite. The specimens of amazonstone obtained from the boulder are of unparalleled magnificence. One which has been sent to the museum of the Duke of Sutherland exhibited a surface of some three square feet, about a dozen large crystals, of which eight were unbroken and perfect. One crystal, unavoidedly broken in the extraction, showed the following extraordinary dimensions:—viz., a length of 15½ inches, with a breadth and thickness of ten and eight inches respectively. The minute structure of these crystals is peculiar, and has been fully described in a recent paper by Dr. Heddle on Scottish felspars in the *Transactions* of the Royal Society of Edinburgh. The exceedingly rare thorite was found in only a small quantity. From an examination of the granite of this and other boulders on the same hill, it appears that they have probably come from the huge mass of Ben Laoghal, which lies a few miles inland to the south-west. Should this be their origin, we may expect yet to find new sources of amazonstone, and perhaps other rare minerals among the numerous corries and crags of that picturesque mountain.

TERTIARY LEAF-BEDS OF COLORADO.—Mr. E. L. Berthoud, of the Territorial School of Mines, Golden City, Colorado, sends notes of a section near that place which presents some considerable resemblance to the sections in Antrim and Mull, where the miocene leaf-beds and lignites are associated with sheets of basalt and tuff. The order of succession is as follows:—

Basalt	120	feet
Lignite and leaf-bed	2½	,,
Hard muddy clay and sandstone	13	,,
Second leaf-bed	3	,,
Clay, sandstone, conglomerate	40	,,
Third small leaf-bed in clay	2	,,
Sandstone and clay, &c.	30	,,
Basalt	25	,,

The resemblance is further borne out by Mr. Berthoud's list of plants, which includes *Platanus aceroides*, *Filicites hebridica*, *Populus arctica*, *Corylus McQuarii*, *Fagus macrophylla*, *Quercus chlorophylla*, *Sequoia*, sp. (?), *Gymnogramma Haydeni*, *Cinnamomum*, n. sp., *Ficus*, 2 sp. nov., *Magnolia*, 2 sp, *Juglans*, 2 sp., *Sabal Campbellii*, *S. Grayana*, and *S. goldianus*, *Myrica*, &c.

INFLUENCE OF ANCHOR-ICE UPON FISHING-GROUNDS.—Prof. Hind, to whose late researches in Labrador we recently called attention, has published some remarks on the effects of the formation of ground-ice in retarding the decomposition of fish-offal, and thereby in seriously damaging the value of the Labrador fishing-grounds. He shows that the ice formed on the sea-bottom freezes the offal, and protects it from being devoured by sea-scavengers and from decomposition; that every rise in temperature which prevents the formation of anchor-ice promotes the decomposition of the offal; that when this takes place, as it does every year under a covering of surface-ice, the water, not being aërated, becomes foul with gases and from the removal of its oxygen, and that the result is fatal to the young cod and other fry which then seek the coasts in search of food. He states that vast multitudes of the young fish are, from this cause, destroyed every summer and autumn in the bays and fjords, and he accounts for changes which have taken place in the migratory movements of seals by this wholesale destruction of the food which they used formerly to find in the coast-waters. He recommends the utilisation of the offal, which would not only eventually prove remunerative as a source of artificial manure, but would remove the poisonous gases which are set free on the melting of the anchor-ice at a time when they cannot fail to prove highly destructive.

ORIGIN OF THE TREES AND SHRUBS IN THE SOUTH OF FRANCE.—In a recent memoir presented to the Academy of Sciences of Montpellier, the veteran professor Charles Martins discusses the history of those trees and shrubs in the south of France which suffer from severe cold, such as the carob-tree, oleander, European palm, myrtle, sweet-bay, pomegranate, olive, fig, laurustinus, ilex, vine, and others. He shows that most of these occur among the tertiary and quaternary deposits, that some of them, indeed, like the oleander (*Nerium oleander*), go back even into eocene times. He points to the fact that their remains occur in the geological formations, not only of the countries where the plants are still living, but even of tracts considerably further to the north, both in France and in Switzerland, where their living descendants or analogues could not endure the severity of winter now. The tender trees and shrubs of the Mediterranean seaboard thus serve to prove the former warmer climate of France and its subsequent refrigeration. They are merely the surviving relics of a tertiary vegetation preserved by the exceptional mildness of the climate in which they grow. A single winter of exceptional rigour, or even a single night of extreme cold, like that of January 13, 1826, when the thermometer fell to 9°·7 below zero (Cent.), would suffice to destroy them. It may be presumed, however, that during at least the height of the glacial period these tender plants were driven southwards beyond their present northern limits, and that they have subsequently crept north again.

U.S. NATIONAL ACADEMY OF SCIENCES

ACCORDING to the terms of its charter from Congress, the National Academy of Sciences must hold its annual meeting in April, at Washington. It holds also a semi-annual meeting in the autumn. Its membership has been very slowly increasing, till now it numbers nearly, if not quite, 100. At the last meeting, April 17-20, Prof. Henry presided. The Academy resolved to present a memorial to Congress, in favour of the establishment and maintenance of an International Bureau of Weights and Measures with the object of promoting permanence, precision, and uniformity in the standards, by the joint action of the leading powers of the world, according to the convention submitted to the Senate.

Five new members were elected:—Prof. John W. Draper and Dr. Henry Draper of New York, Dr. Elliot Coues of Washington, Dr. S. H. Scudder of Cambridge, Mass., and Mr. Charles S. Peirce of the U.S. Coast Survey.

The annual report of the president, Prof. Henry, recounts briefly the year's work of the Academy. The Academy reports progress in the work of preparing and publishing the scientific results saved from the wreck of the *Polaris* and in general contributed by the expedition in which that vessel was engaged. This work is in the hands of Dr. Emil Bessels, the scientific director of the expedition, and will be finished in three quarto volumes. The first volume is already published; it is a quarto of 960 pages relating to astronomy, pendulum experiments, winds, solar radiation, and meteorology in general. It is illustrated by fourteen plates, two maps, and forty woodcuts; only 500 copies of this volume were printed. The second and third volumes relate to geology, palæontology, mineralogy, botany, zoology, and ethnology. They will include a monograph on the Eskimo, illustrated by 100 plates and 200 woodcuts. The Academy has divided the income from the Bache fund, so as to